

### Trend Study 11B-7-00

Study site name: Cottonwood .

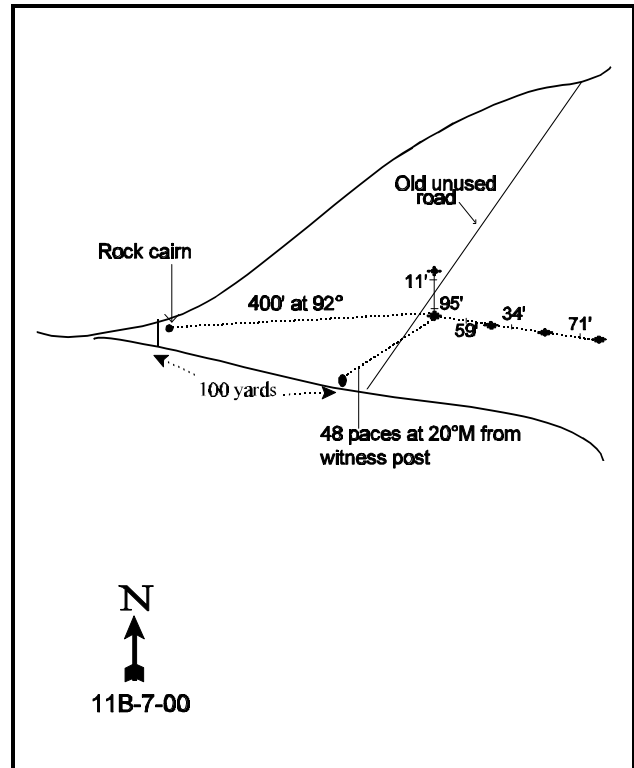
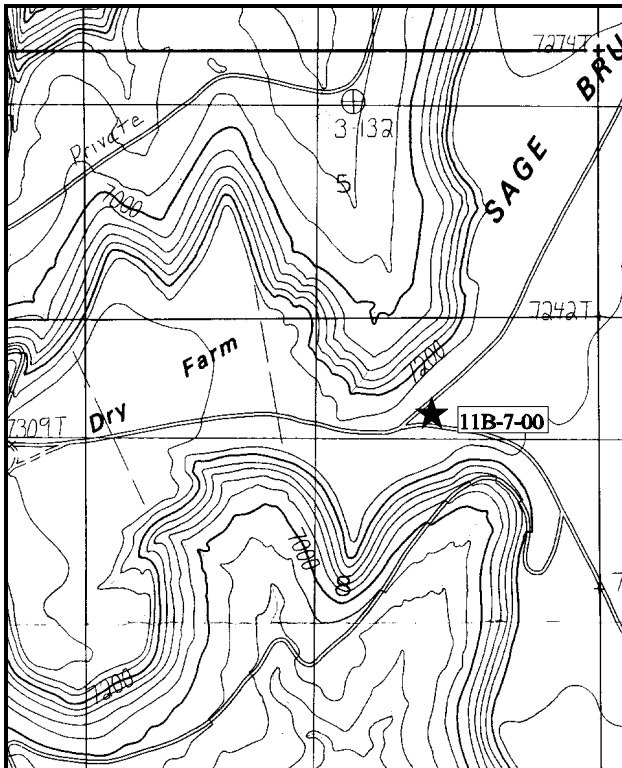
Range type: Big Sagebrush .

Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks frequency belts) line 1 (11 & 95ft), line 2 (59ft), line 3 (34ft), line 4 (71ft).

### LOCATION DESCRIPTION

At the Range Creek Summit (Bruin Point) take the middle fork and go 0.35 miles. Stay right at the fork just beyond a cattle guard and go 0.9 miles. Pass straight through an intersection beyond the next cattle guard and go 3.1 miles. Turn left at the fork and continue 2.5 miles. Pass through a gate near a cabin and continue 3.2 miles. Cross a cattle guard and proceed 5.3 miles on the main road. Bear right, cutting across the angle of a fork, and go 0.2 miles to a cattle guard. Continue 0.5 miles to another major fork. Stay right and go 100 yards to a rebar witness post on left side of the road. The 100-foot baseline stake is 48 paces at 20°M from the witness post. All markers are rebar, and the 0-foot end of the baseline has a browse tag #7872 attached.



Map Name: Twin Hollow

Diagrammatic Sketch

Township 13S , Range 16E , Section 8

UTM. 4396125.773 N, 573453.778 E

## DISCUSSION

### Trend Study No. 11B-7 (32-11)

The Cottonwood transect samples a sagebrush flat at the northeast end of Cottonwood Ridge. The extensive sagebrush opening is surrounded by a mature pinyon pine woodland which gradually slopes down to steep canyons that drain east into the Green River. Terrain at the study site is nearly level with an elevation of 7,200 feet. A pellet group transect which runs north of the transect was read every year until 1989 when it was dropped. Data from the previous years was quite variable, but no use was the most common result. During the 12 years previous to 1989, deer did not use the area during most of the winters, and use ranged from 1 to 9 deer days use/acre (2 to 23 ddu/ha) during any one year. Correspondingly, few deer and elk pellet groups were found on the study site. Both deer and elk had the same quadrat frequency in 1994 (10%). Quadrat frequency of deer and elk pellet groups dropped in 2000 to only 1% and 6% respectively. A pellet group transect read along the study site baseline in 2000 estimates 23 elk and 1 deer days use/acre (57 edu/ha and 2 ddu/ha). Cattle grazing pressure also appears to have been low during past readings and widely dispersed. As part of the Green River allotment, the area receives spring cattle use during some years, although the allotment has been closed to grazing since 1994.

The soil is moderately deep and rocky with an effective rooting depth estimated at nearly 14 inches. There appears to be a layer of bedrock or a hardpan 12-16 inches below the surface. Deeper depth measurements were possible under sagebrush. The soil is a loam with a slightly alkaline soil reaction (7.4 pH). Phosphorus is limited at only 4.6 ppm, where values less than 10 ppm may limit normal plant growth and development. Much of the soil surface was exposed in 1986 when 59% of the ground surface was estimated as bare ground. Bare ground continues to be moderately high at around 40%. Litter and cryptogamic cover is limited to the areas beneath the sagebrush canopy. There is some evidence of soil movement and soil pedestaling around sagebrush, but the flat terrain prevents severe erosion.

This sagebrush flat is dominated by an overly mature stand of Wyoming big sagebrush which provided 96% of the browse cover in 1994 and 98% in 2000. The sagebrush density was estimated at 5,132 plants/acre in 1986, decreasing slightly in 1994 to 4,020 plants/acre. Most of the change in density appears to be from the loss of decadent plants which had a density of 3,400 plants/acre in 1986 and 1,420 by 1994. This change along with an increase in mature plants has reduced percent decadency from 66% to 35%. The percentage of the plants showing poor vigor also improved from 32% in 1986 to only 14% in 1994. Density increased slightly to 4,140 plants/acre in 2000 but vigor is poor on 31% of the plants sampled and 69% of the population is now decadent. A large proportion of the mature sagebrush sampled in 1994 are now decadent and 43%, or 1,240 plants/acre, of those decadent shrubs appear to be dying. Reproduction is currently poor. Sagebrush showing heavy use has increased steadily from 12% in 1986 to 19% in 1994, and 32% in 2000. Currently ('00), 61% of the sagebrush sampled display moderate to heavy use. The plants on this site have produced limited new growth and are not very vigorous. This condition makes the hedging appear more severe when coupled with the extended drought.

Broom snakeweed, an increaser, occurs in the bare interspaces. It has fluctuated in density but currently appears to have a stable, mostly mature population. Very few pinyon are found in the flat and they do not appear to be increasing. The surrounding woodland provides good cover.

Herbaceous plants are not of much importance in terms of deer winter range. However, the herbaceous species do provide some spring forage. Grass abundance is moderate for a Wyoming sagebrush type. The majority of the grasses are found in the protection of the sagebrush with exception of needle-and-thread and western wheatgrass. In recent years, grazing pressure has been moderate, but historically the area was subjected to long periods of excessive use by livestock. Since 1994, with no livestock grazing, cover of perennial grasses has nearly tripled and frequency has increased as well.

Forbs are diverse and produced as much cover as the grasses in 1994. Due to dry conditions in 2000, frequency of forbs declined. The majority of the forbs are found growing within the protection of the sagebrush, except for the low rounded mats of desert phlox. None are particularly important. Lobe-leaf groundsel, scarlet globemallow, and desert phlox are the most obvious species.

#### 1986 APPARENT TREND ASSESSMENT

The key species, Wyoming big sagebrush, shows a high incidence of decadence (66%) and poor vigor (32%), but the biotic potential (# of seedlings) is 30%. Recruitment appears adequate to maintain the stand so trend appears to be fairly stable. The shallow soil is a factor that cannot be changed, but a favorable water year would do much to improve the condition of the sagebrush. At this time, there does not appear to be excessive use by livestock or big game. Due to its scattered and clumped distribution, the winterfat will always appear to be over utilized. The soil is in poor condition due to the large amounts of unprotected bare ground and lack of litter cover.

#### 1994 TREND ASSESSMENT

The trend for soils has improved slightly since 1986 with the decrease in percent bare ground from 59% to 44% and a significant increase in the sum of nested frequency for western wheatgrass which is highly rhizomatous. The key browse, Wyoming big sagebrush, makes up 96% of the browse cover. It has experienced significant improvements in vigor and a decrease in percent decadence. The density has gone down, but the population appears more healthy and vigorous. Trend for browse is stable. The herbaceous understory has noted a slight increase in nested frequency for grasses and forbs. There has been a very significant increase in western wheatgrass. Trend for herbaceous understory is slightly improved.

##### TREND ASSESSMENT

soil - slightly up (4)

browse - stable (3)

herbaceous understory - slightly up (4)

#### 2000 TREND ASSESSMENT

Trend for soil appears to be improving slightly with similar amounts of bare ground combined with increased perennial grass cover and nested frequency. Trend for the key browse species, Wyoming big sagebrush is slightly down. Density has increased slightly from 4,020 plants/acre in 1994 to 4,140 by 2000. However, the proportion of plants in poor vigor has increased from 14% in 1994 to 31%, and percent decadence has gone up from 35% to 69%. Reproduction is poor and 1,240 plants/acre of the decadent sagebrush are classified as dying. There is currently not enough young plants to replace the dying shrubs. Use is moderate to heavy but these shrubs are not very vigorous and have limited growth which makes them appear more heavily hedged. The downward trend is more a response to the increased competition with the herbaceous understory combined with the extremely dry conditions of the past few years. An above normal precipitation pattern, especially in the spring and early summer, would do much to reverse this trend. The herbaceous understory displays a mixed trend. Cover and frequency of perennial grasses have increased dramatically. The biggest change comes from the significant increase in Indian ricegrass. On the down side, due in part to the dry spring and summer, frequency of perennial forbs has declined. Overall, the herbaceous trend is considered up slightly.

##### TREND ASSESSMENT

soils - slightly improving (4)

browse - slightly down (2)

herbaceous understory - slightly up (4)

HERBACEOUS TRENDS --

Herd unit 11B, Study no: 7

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
G	Agropyron smithii	<sub>a</sub> 88	<sub>b</sub> 203	<sub>b</sub> 235	35	71	87	2.58	4.73
G	Elymus salina	<sub>a</sub> -	<sub>b</sub> 7	<sub>b</sub> 6	-	3	3	.18	.01
G	Oryzopsis hymenoides	<sub>a</sub> 73	<sub>a</sub> 65	<sub>b</sub> 116	34	27	47	1.00	6.86
G	Poa fendleriana	<sub>b</sub> 14	<sub>ab</sub> 8	<sub>a</sub> 2	7	3	1	.01	.03
G	Sitanion hystrix	<sub>b</sub> 68	<sub>a</sub> 26	<sub>a</sub> 30	32	11	15	.30	.61
G	Stipa comata	<sub>b</sub> 116	<sub>a</sub> 79	<sub>ab</sub> 99	56	37	37	1.57	3.81
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		359	388	488	164	152	190	5.66	16.09
Total for Grasses		359	388	488	164	152	190	5.66	16.09
F	Antennaria rosea	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 11	-	-	4	-	.02
F	Arabis drummondi	<sub>b</sub> 20	<sub>a</sub> 8	<sub>a</sub> 4	12	4	2	.01	.01
F	Castilleja chromosa	<sub>b</sub> 5	<sub>ab</sub> 1	<sub>a</sub> -	4	1	-	.00	-
F	Chaenactis douglasii	-	1	-	-	1	-	.00	-
F	Cryptantha fulvocanescens	<sub>b</sub> 48	<sub>c</sub> 73	<sub>a</sub> -	23	31	-	.65	-
F	Erigeron eatonii	-	1	4	-	1	2	.00	.01
F	Eriogonum racemosum	-	4	-	-	2	-	.01	-
F	Erigeron speciosus	<sub>b</sub> 6	<sub>a</sub> -	<sub>a</sub> -	4	-	-	-	-
F	Hymenoxys acaulis	<sub>a</sub> -	<sub>a</sub> 7	<sub>b</sub> 18	-	3	11	.01	.10
F	Lesquerella spp.	<sub>B</sub> 19	<sub>ab</sub> 18	<sub>a</sub> 7	11	7	3	.03	.01
F	Machaeranthera canescens	-	1	-	-	1	-	.00	-
F	Phlox austromontana	<sub>a</sub> 144	<sub>b</sub> 203	<sub>b</sub> 199	62	83	78	4.51	5.32
F	Senecio multilobatus	<sub>b</sub> 71	<sub>c</sub> 107	<sub>a</sub> 3	34	53	2	.49	.01
F	Sphaeralcea coccinea	34	21	30	14	12	14	.11	.11
F	Townsendia incana	<sub>b</sub> 54	<sub>b</sub> 32	<sub>a</sub> 5	25	17	4	.08	.02
F	Unknown forb-perennial	<sub>b</sub> 9	<sub>a</sub> -	<sub>a</sub> -	3	-	-	-	-
Total for Annual Forbs		0	0	0	0	0	0	0	0
Total for Perennial Forbs		410	477	281	192	216	120	5.95	5.63
Total for Forbs		410	477	281	192	216	120	5.95	5.63

Values with different subscript letters are significantly different at  $\alpha = 0.10$  (annuals excluded)

BROWSE TRENDS --

Herd unit 11B, Study no: 7

Type	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
B	<i>Artemisia tridentata wyomingensis</i>	85	84	14.30	15.89
B	<i>Ceratoides lanata</i>	3	1	-	-
B	<i>Gutierrezia sarothrae</i>	39	27	.59	.29
B	<i>Opuntia</i> spp.	3	3	-	.00
B	<i>Pinus edulis</i>	0	2	.00	.00
Total for Browse		130	117	14.90	16.20

BASIC COVER --

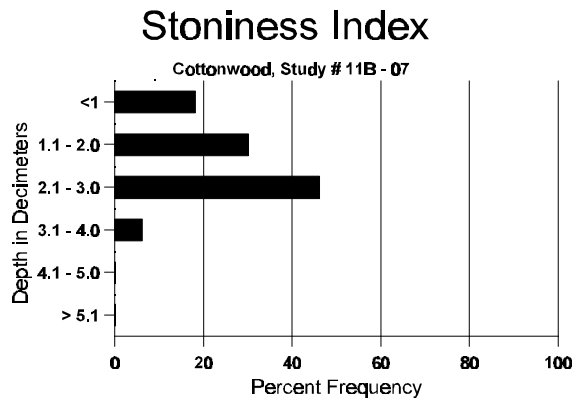
Herd unit 11B, Study no: 7

Cover Type	Nested Frequency		Average Cover %		
	'94	'00	'86	'94	'00
Vegetation	325	331	4.25	25.72	38.57
Rock	181	49	.75	2.25	1.16
Pavement	285	230	9.00	1.00	1.81
Litter	363	346	25.75	16.70	24.78
Cryptogams	142	245	1.25	2.92	8.11
Bare Ground	365	346	59.00	43.98	40.79

SOIL ANALYSIS DATA --

Herd Unit 11B, Study # 7, Study Name: Cottonwood

Effective rooting depth (inches)	Temp °F (depth)	pH	% sand	% silt	% clay	% OM	PPM P	PPM K	dS/m
13.89	62.4 (15.12)	7.4	42.0	31.4	26.6	2.3	4.6	208.0	0.8



PELLET GROUP FREQUENCY --

Herd unit 11B, Study no: 7

Type	Quadrat Frequency		Pellet Transect	
			Pellet Groups per Acre	Days Use per Acre (ha)
	'94	'00	'00	'00
Rabbit	43	40	261	N/A
Elk	10	6	305	24 (58)
Deer	10	1	17	2 (4)

BROWSE CHARACTERISTICS --

Herd unit 11B, Study no: 7

A G R E	Y	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Artemisia tridentata wyomingensis																	
S	86	22	1	-	-	-	-	-	-	-	23	-	-	-	1533		23
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1
Y	86	6	-	1	-	-	-	-	-	-	6	-	-	1	466		7
	94	1	-	-	2	-	-	-	-	-	3	-	-	-	60		3
	00	6	1	-	-	-	-	-	-	-	6	-	-	1	140		7
M	86	10	8	1	-	-	-	-	-	-	10	8	-	1	1266	24 25	19
	94	102	21	5	-	-	-	-	-	-	128	-	-	-	2560	22 31	128
	00	20	19	17	-	1	-	-	-	-	56	1	-	-	1140	21 32	57
D	86	18	26	7	-	-	-	-	-	-	19	9	2	21	3400		51
	94	13	24	31	-	-	2	-	-	-	41	-	-	29	1400		70
	00	54	31	49	-	9	-	-	-	-	79	-	2	62	2860		143
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	580		29
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	1240		62
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
		'86			44%			12%			32%						
		'94			22%			19%			14%						
		'00			29%			32%			31%						
Total Plants/Acre (excluding Dead & Seedlings)												'86	5132	Dec:	66%		
												'94	4020		35%		
												'00	4140		69%		

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Ceratoides lanata																		
Y	86	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	94	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	1	1	2	-	-	-	-	-	-	4	-	-	-	266	9	6	4
	94	1	-	-	-	-	-	2	-	-	3	-	-	-	60	6	5	3
	00	-	-	-	-	-	1	-	-	-	1	-	-	-	20	-	-	1
D	86	-	-	1	1	-	-	-	-	-	1	-	-	1	133		2	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		11%			33%			11%			-87%							
'94		00%			00%			00%			-75%							
'00		00%			100%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	599	Dec:	22%			
												'94	80		0%			
												'00	20		0%			
Gutierrezia sarothrae																		
S	86	6	-	-	-	-	-	-	-	-	6	-	-	-	400		6	
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	86	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	00	10	-	-	-	-	-	-	-	-	10	-	-	-	200			10
M	86	5	-	-	-	-	-	-	-	-	5	-	-	-	333	7	3	5
	94	121	-	-	-	-	-	-	-	-	121	-	-	-	2420	5	7	121
	00	74	-	-	-	-	-	-	-	-	74	-	-	-	1480	3	4	74
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	7	-	1	-	-	-	-	-	-	2	-	-	6	160			8
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	360			18
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%			+77%							
'94		00%			.76%			05%			-36%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	599	Dec:	0%			
												'94	2620		6%			
												'00	1680		0%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Opuntia spp.																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	86	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	94	3	-	2	-	-	-	-	-	-	3	-	-	2	100	2	5	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40	3	6	
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	2	-	-	-	-	-	-	-	-	-	2	40		2	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%			-30%							
'94		00%			57%			57%			-57%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	200	Dec:	0%			
												'94	140		29%			
												'00	60		0%			
Pinus edulis																		
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	1	-	-	-	-	-	2	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'86		00%			00%			00%										
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'86	66	Dec:	-			
												'94	0		-			
												'00	40		-			